US. FOODS AND BEVERAGES
147
426/17
17
1877
Return to Div. 6,
RECORDED

A.D. 1877, 1st SEPTEMBER. N° 3331.

Extracting Alcohol, Acetic Acid, &c., from Locust Beans.

LETTERS PATENT to Henry Garth, of 7, North Parade, Beverley Road, Kingston-upon-Hull, and 11, Clement's Lane, in the City of London, Civil Engineer, and John Ostler, of 21, High Street, Kingston-upon-Hull aforesaid, Merchant, for the Invention of "THE PREPARATION AND EXTRACTION OF ALCOHOL, ETHER, FUSEL OIL, AND ACETIC AND OTHER ACIDS FROM LOCUST BEANS AND LOCUST MEAL, AND A NOVEL MEDIUM FOR FILTERING LIQUIDS PRODUCED OR USED IN THE ABOVE PROCESS."

Sealed the 26th February 1878, and dated the 1st September 1877.

PROVISIONAL SPECIFICATION left by the said Henry Garth and John Ostler at the Office of the Commissioners of Patents on the 1st September 1877.

HENRY GARTH, of 7, North Parade, Beverley Road, Kingston-upon-Hull, and 11, Clement's Lane, in the City of London, Civil Engineer, and JOHN OSTLER, of 21, High Street, Kingston-upon-Hull aforesaid, Merchant. "THE PREPARATION AND EXTRACTION OF ALCOHOL, ETHER, FUSEL OIL, AND ACETIC AND OTHER ACIDS FROM LOCUST BEANS AND LOCUST MEAL, AND A NOVEL MEDIUM FOR FILTERING LIQUIDS PRODUCED OR USED IN THE ABOVE PROCESS."

Prepared locust meal and locust beans have been known in this country for many years, but they have been used almost exclusively as food for cattle. There is an extremely large proportion of sacharine matter in these beans, which, though incapable of crystallisation, is capable of fermentation. They are particularly suitable for the manufacture of alcohol absolute, and other products of which alcohol forms the base.

For the purpose of making alcohol or ether we either press the beans or by grinding or otherwise treating in a proper manner reduce the beans to meal, or, which we prefer, use the locust meal of commerce. These beans or the meal we treat with hot or cold water, and with or without the addition of certain chemicals or chemical compounds; and when so treated press it in a suitable manner, and so extract a sacharine liquid capable of fermentation.

[*Price 4d.*]

This liquid we submit to alcoholic fermentation, and from it when fermented extract alcohol by distillation or other suitable process.

In making acetic and other acids we take the meal as mixed with water, and with or without the addition of suitable chemicals or chemical compounds, and subject it to the ordinary process of fermentation and other processes commonly in use in extracting such products from other substances.

For filtering the liquids produced or used in the above processes, as herein-before mentioned, we use as a medium a mixture of fullers' earth and animal or vegetable charcoal, or some or one of them, according to circumstances.

The refuse resulting from the above processes we press into cakes, or otherwise treat it as food for cattle.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said Henry Garth and John Ostler in the Great Seal Patent Office on the 27th February 1878.

HENRY GARTH, of 7, North Parade, Beverley Road, Kingston-upon-Hull, and 11, Clement's Lane, in the City of London, Civil Engineer, and JOHN OSTLER, of 21, High Street, Kingston-upon-Hull aforesaid, Merchant. "THE PREPARATION AND EXTRACTION OF ALCOHOL, ETHER, FUSEL OIL, AND ACETIC AND OTHER ACIDS FROM LOCUST BEANS AND LOCUST MEAL, AND A NOVEL MEDIUM FOR FILTERING LIQUIDS PRODUCED OR USED IN THE ABOVE PROCESS."

The first part of our Invention relates to the preparation and extraction of alcohol, ether, fusel oil, and acetic and other acids from locust beans and locust meal.

Prepared locust meal and locust beans, although for many years well known in this country, have hitherto been used almost exclusively as food for cattle. Now we have discovered that the extremely large proportion of saccharine matter contained therein, though incapable of crystallisation, yet admits of fermentation; such beans or bean meal are therefore particularly adapted not only to the manufacture of alcohol absolute, but also of other products of which alcohol forms the base.

For the purpose of obtaining alcohol, or any alcoholic product, we proceed as follows:—We take either locust beans, or preferably, the ordinary locust bean meal of commerce. When using the latter we mix the meal either with hot or cold water in the ratio of about 1 ton of meal to from 600 to 900 gallons of water, and sometimes we add thereto about one quarter per cent., more or less, of sulphuric or any other suitable acid, in order to convert the cellulose and other matters contained in the beans or meal into fermentable saccharine matter. We then heat the mixture in any suitable vessel or apparatus; or, if more convenient, we carry out this process in vacuo.

The period during which these processes are repeated or carried on, as well as the proportion of water used, depends upon the quantity of saccharine matter we desire to obtain, and upon the required strength of such saccharine solution, which solution we will hereafter call wash.

The separation or elimination of the sediment, dregs, or refuse from the saccharine solution may be performed by pressure or any other well-known means.

If required, as in the case when heat has been used in addition to the action of hot or cold water, or when it is found that the wash is too hot to ferment readily, we pass the wash through a refrigerator, or otherwise cool it, and then submit it to alcoholic fermentation in the ordinary way.

Sometimes we assist the fermentation by pressing a current of hot or cold air into the fermenting vats by means of an air pump, and from this fermented wash we obtain by distillation or other suitable means alcohol of a greater or less strength as desired.

When using locust beans, instead of locust bean meal, we first reduce the beans by any well-known means to a more or less coarse meal, which we then treat as before described; or we mash or digest them into a pulp in the following manner:—We supply a suitably shaped boiler or a vacuum pan with any suitable grinding or other reducing apparatus, through which we pass the beans with or without the addition of steam, hot or cold water, and sulphuric or other suitable acid, and so treat the beans until they are reduced to a mash, or more or less pulpy mass, which we mix with water, and obtain a saccharine solution or wash, which we submit to a similar process or processes as herein-before mentioned.

Sometimes we also use hydraulic pressure for the purpose of reducing or assisting the reduction of the beans either before, after, or during the time the beans undergo the above-described grinding or mashing process.

We wish it to be understood that in so doing we do not confine ourselves to any particular details or arrangement for carrying out the same, as such may be varied as circumstances may require, with or without the assistance of the other means and forces mentioned above.

In making ether we subject the alcohol obtained as above described when sufficiently purified to any of the methods or processes known in chemistry, but we prefer to employ what is known as the continuous process of etherification.

In making weak and strong acetic acid (the former commonly called vinegar) we subject the wash with or without the locust bean meal or beans to acetous fermentation, and then treat it in a similar manner to that now used in the manufacture of acetic acid and vinegar from malt and beer, or we subject the alcohol obtained as herein described to what is known as the quick vinegar process.

Butyric acid we obtain by subjecting the wash with or without the locust bean meal or beans to lactic acid or butyric acid fermentation, and treat with chalk-producing butyrate of lime, which latter we distil with hydrochloric acid, and treat the product obtained with chloride of calcium, and so obtain butyric acid in the ordinary manner well known in chemistry.

From the herein-before mentioned processes we obtain a residue or refuse which is adapted for use as food for cattle, either in the same state as we obtain it in, or by mixing it with other suitable substances, and working it up into cakes, or other suitable shapes or forms by ordinary means.

The second part of our Invention relates to a novel medium for filtering the liquids or vapours used or produced in the herein-before described processes, and also for decolouring or otherwise purifying the same.

The medium which we employ for this purpose is fullers' earth, or a mixture or combination of the same, either with animal, vegetable, and mineral charcoal, chlorides, carbonates, or bicarbonates.

When using these materials or substances for filtering or purifying we employ well-known means and arrangements, and we do not therefore confine ourselves to any particular details; but as one example of carrying out this operation we will mention the following:—We first prepare the medium by breaking up fullers' earth into lumps of a convenient size, and mix them or not with from one-half to ten per cent. by weight of one or other or all of the above-named substances. We then put the prepared medium into bags of any suitable textile fabric, such as woollen or other cloth, or into felt bags, or into perforated wooden or metal boxes or other suitable receptacles lined with cloth or any other suitable material, to prevent the filtering medium escaping during the time we pass the liquids or vapours we

wish to filter through it, which latter operation may be effected in any of the various well-known ways.

Having thus particularly described our said Invention, and the manner in which the same is to or may be performed, we would have it understood that we do not confine ourselves to the precise details herein-before described; but what we believe to be novel and original, and therefore claim is,—

1stly. The extraction and preparation of all kinds of alcohol, ether, fusel oil, and acetic and other acids from the ordinary locust meal of commerce or from locust beans, substantially in the manner herein-before described.

2ndly. The employment of combined vacuum and hydraulic pressure, or of either of these forces, alone or in combination with steam or hot or cold water, in order to digest, mash, pulp, or otherwise reduce locust beans, substantially in the manner herein-before described.

3rdly. The employment as a filtering medium of fullers' earth, either alone or in combination with animal, vegetable, and mineral charcoal, chlorides, carbonates, and bicarbonates, or any, either, or all of them, for the purpose of filtering, decolorising, or otherwise purifying the liquids or vapours used or produced in the herein-before described processes.

In witness whereof, we, the said Henry Garth and John Ostler, have hereunto set our hands and seals, this Twenty-sixth day of February, in the year of our Lord One thousand eight hundred and seventy-eight.

HENRY GARTH. (L.S.)
JOHN OSTLER. (L.S.)

LONDON: Printed by George Edward Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

1878.